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Carpentier et al.

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(54) **COLLAR CONFIGURATION FOR FIREFIGHTER GARMENT**

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A41D 3/02 (2006.01)
A62B 17/00 (2006.01)

(52) **U.S. Cl.** **2/98**; 2/81

(58) **Field of Classification Search** 2/458, 7, 2/8.1, 468, 60, 97, 116, 129, 202, 206, 207, 2/98, 96, 90, 91, 93, 85, 94
See application file for complete search history.

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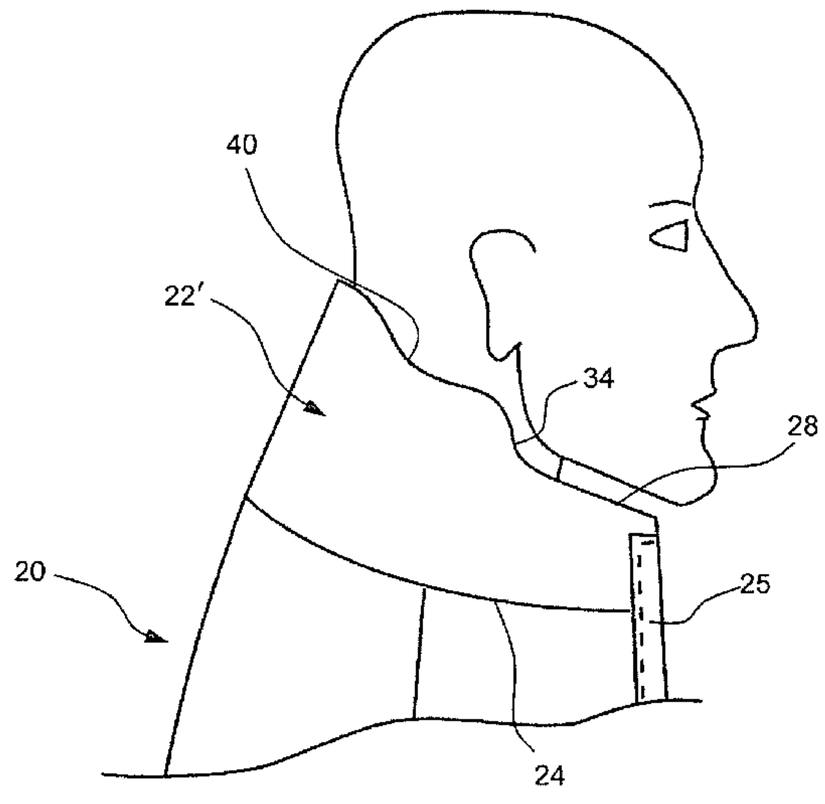
(57) **ABSTRACT**

A jacket of the type used by firefighters as protective garment. A collar of the jacket comprises a lower edge connected to a shoulder/torso portion of the jacket in a straight seam. An upper exposed edge is spaced apart from the lower edge. A given shape is provided to the upper exposed edge such that a variable height is defined between the lower edge and the upper exposed edge along the upper exposed edge.

7 Claims, 8 Drawing Sheets



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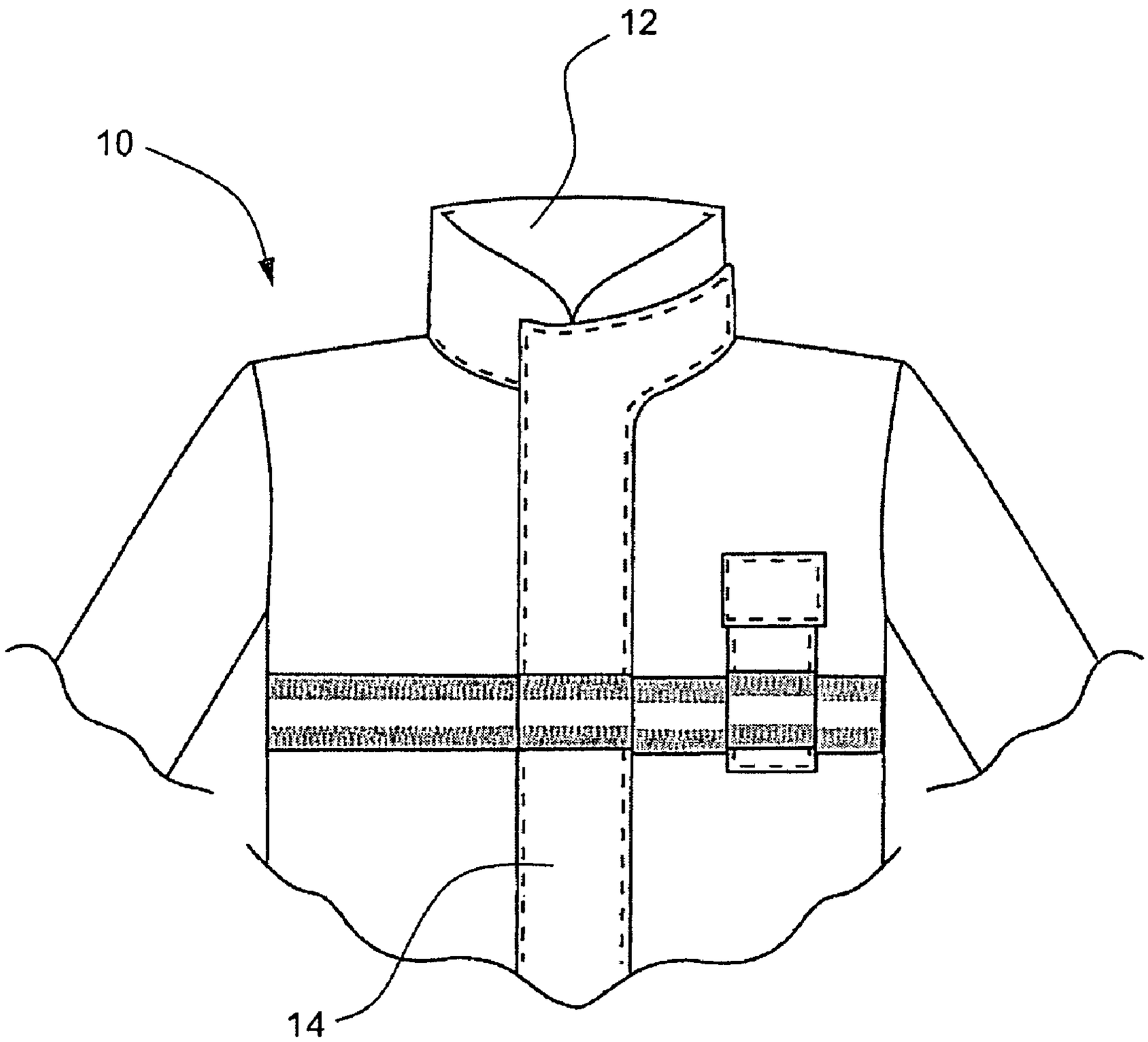

Fig. 1 (PRIOR ART)

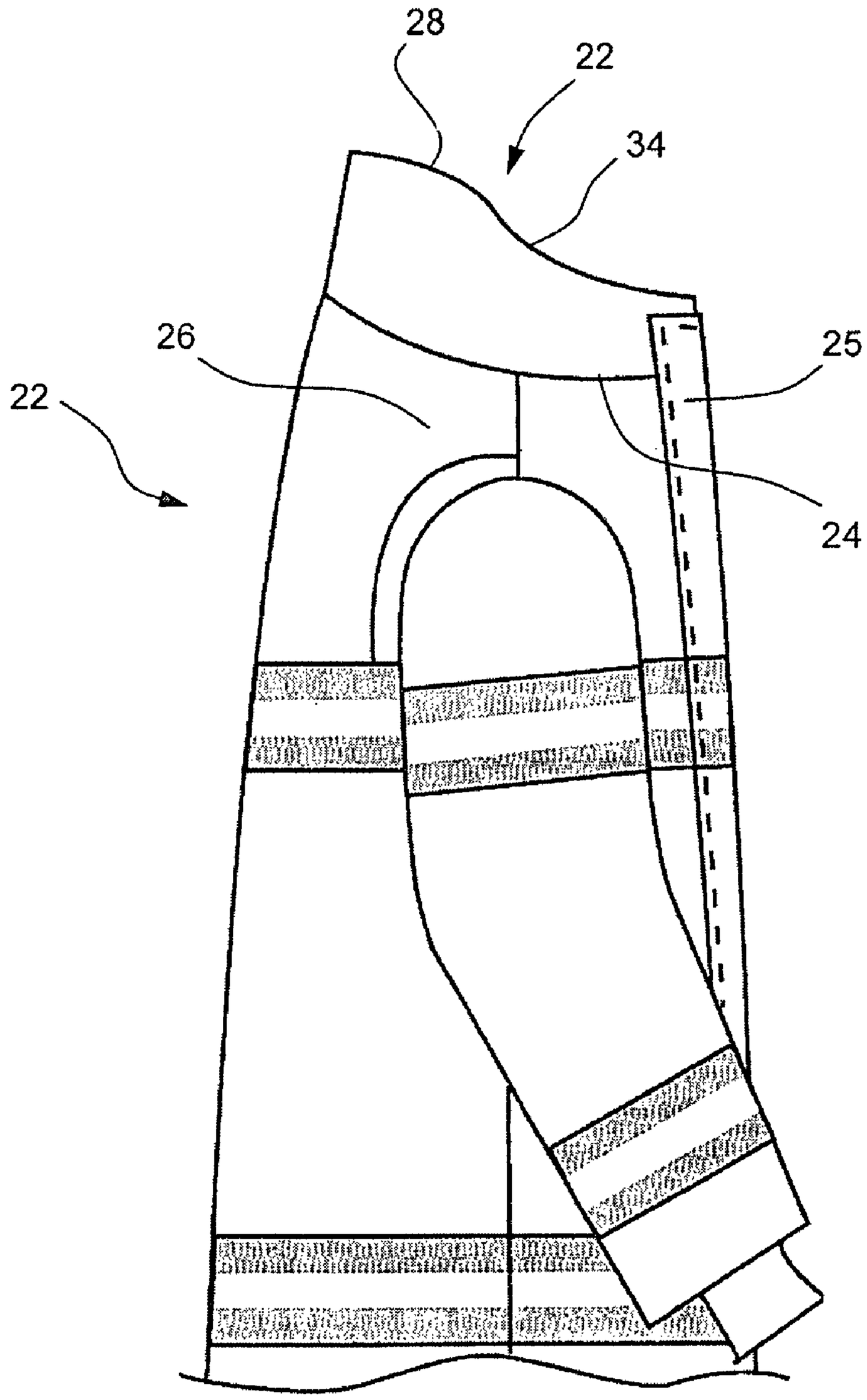

Fig. 2

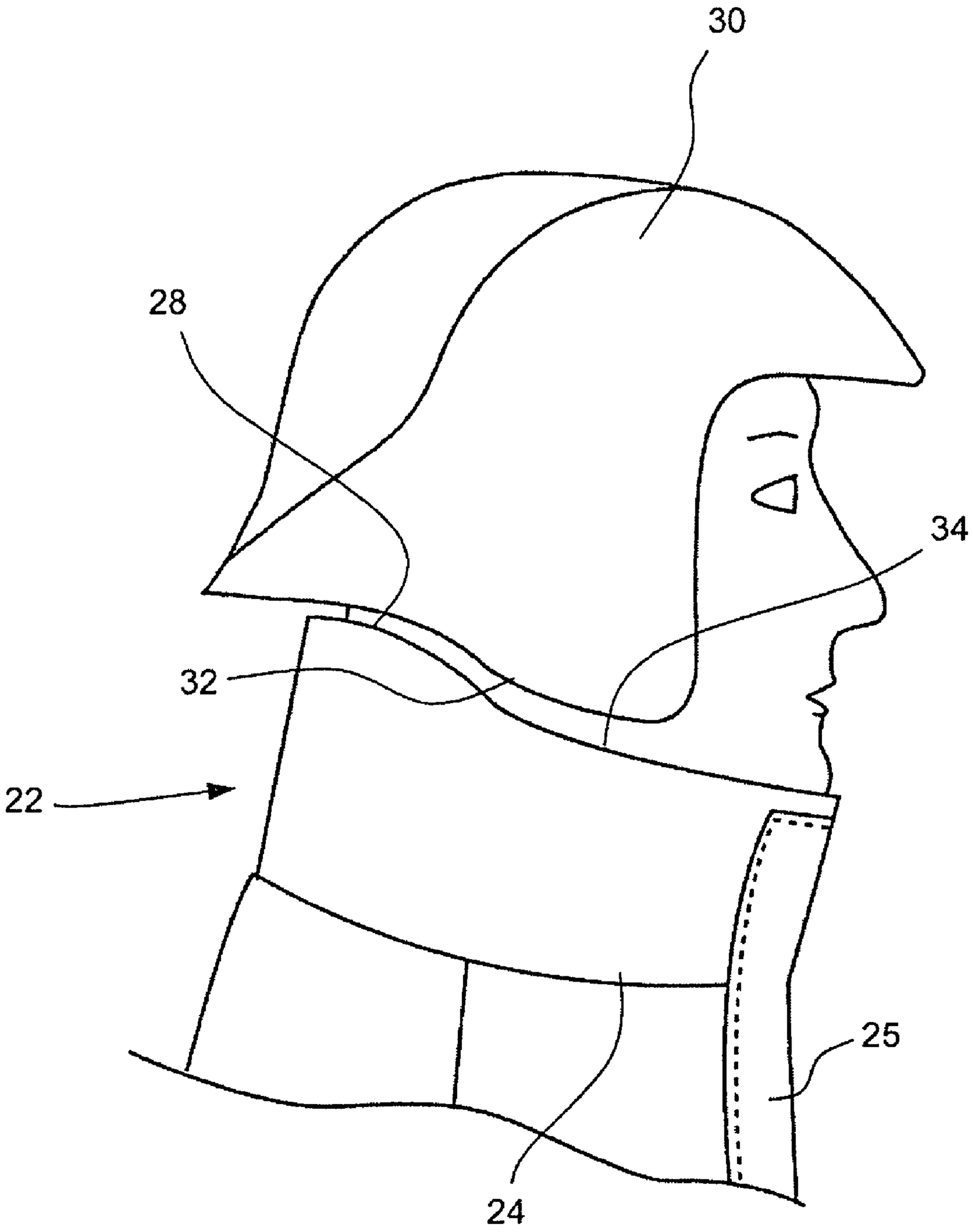

Fig. 3

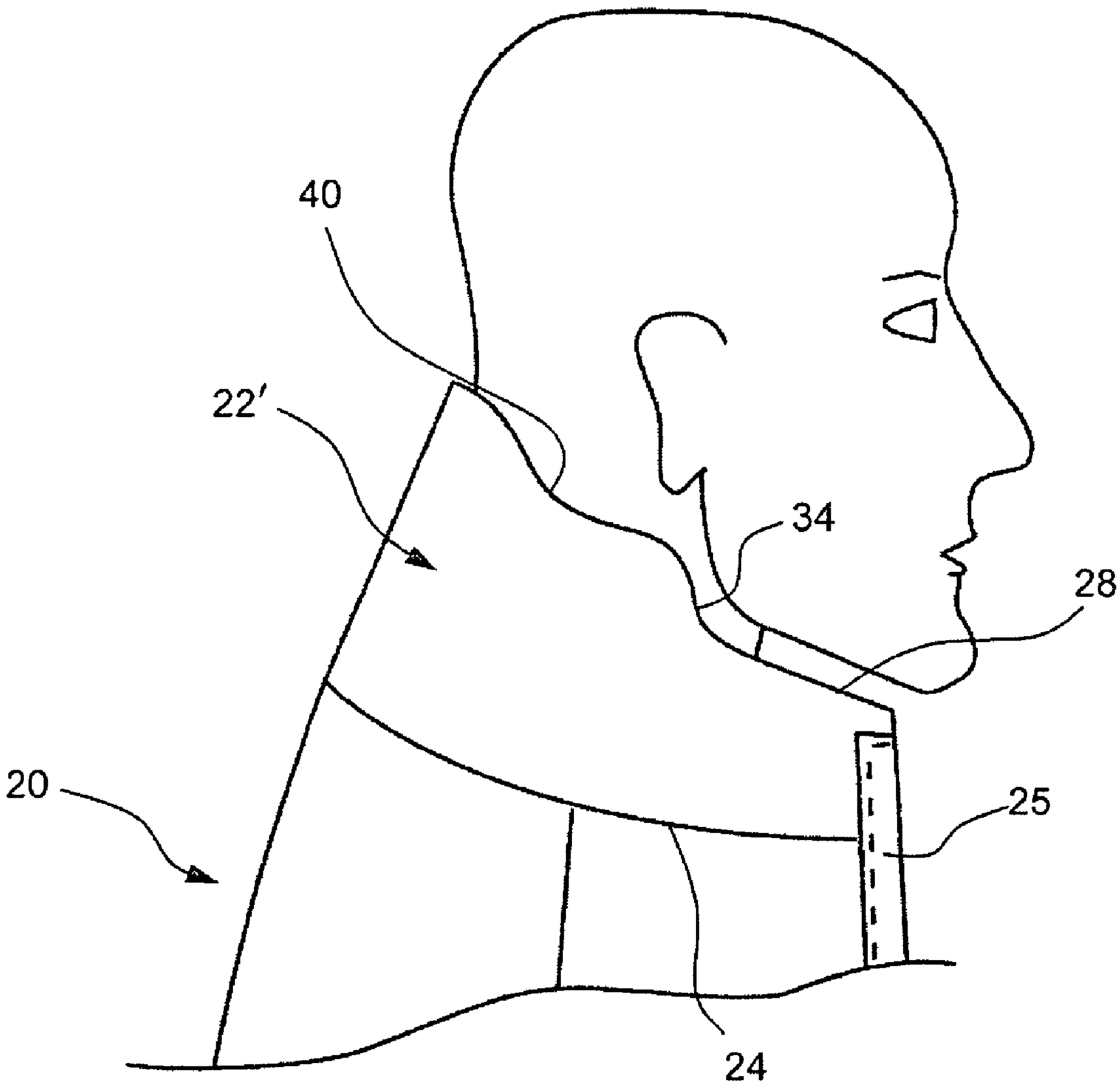

Fig. 4

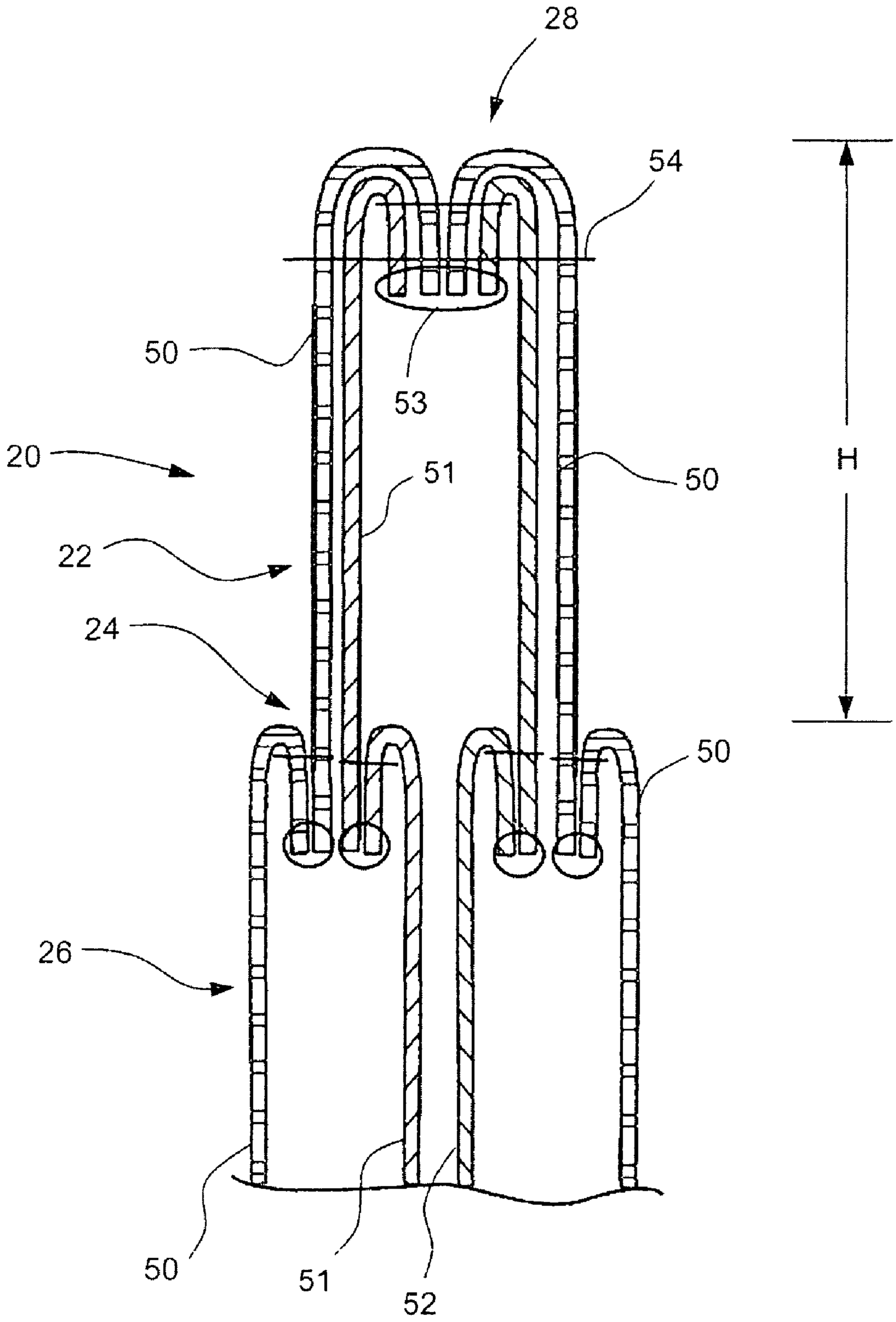

Fig. 5

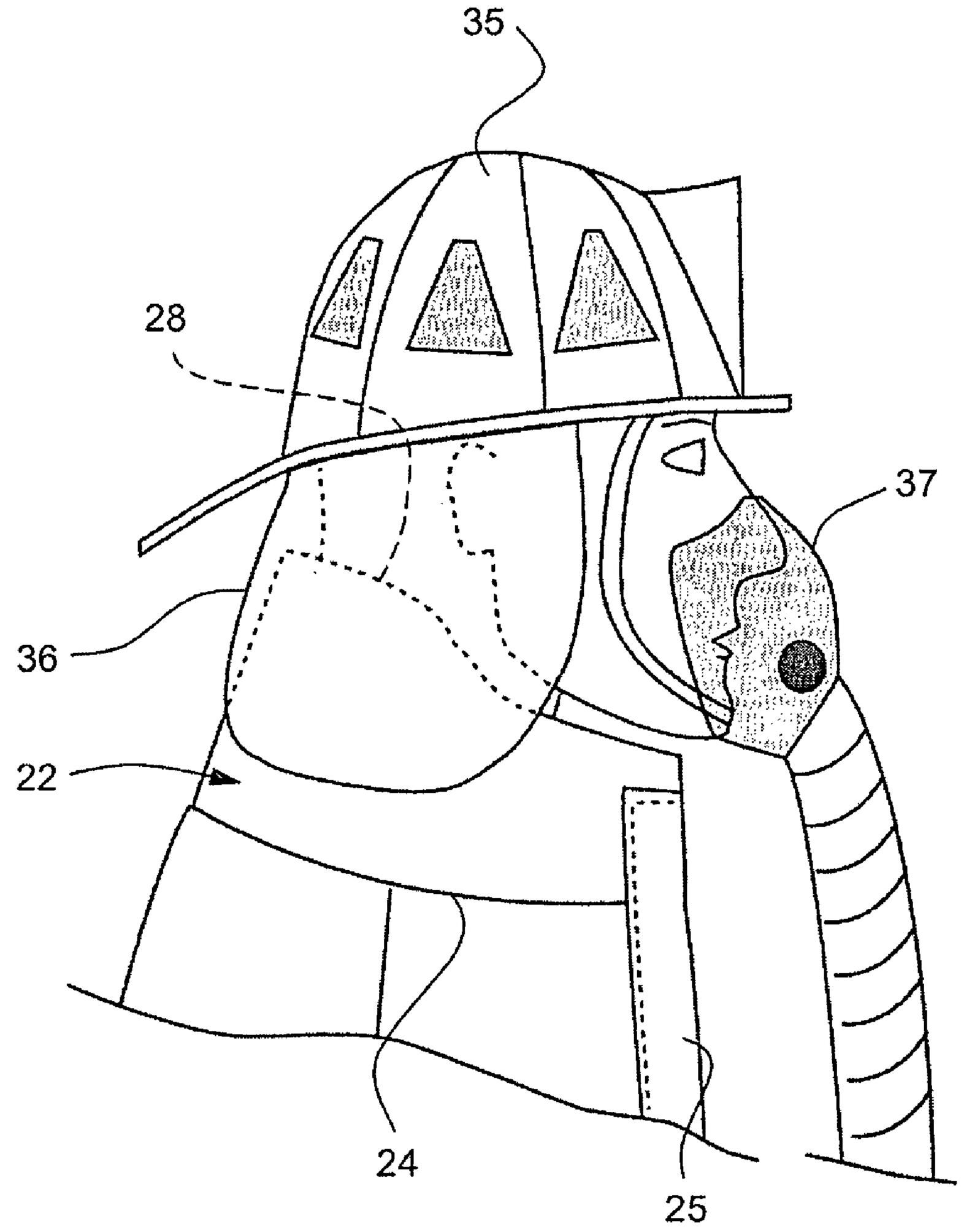

Fig. 6

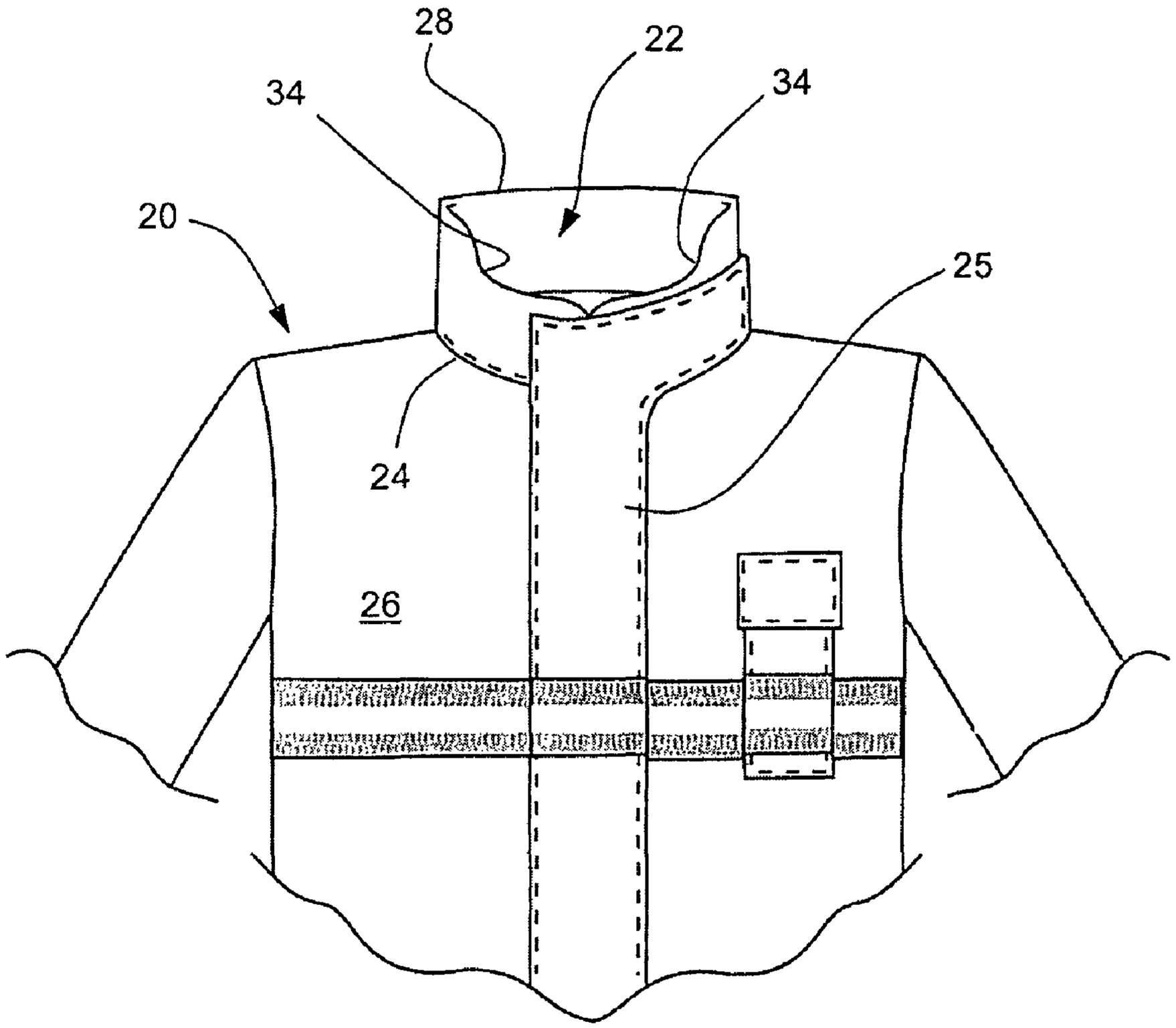

Fig. 7

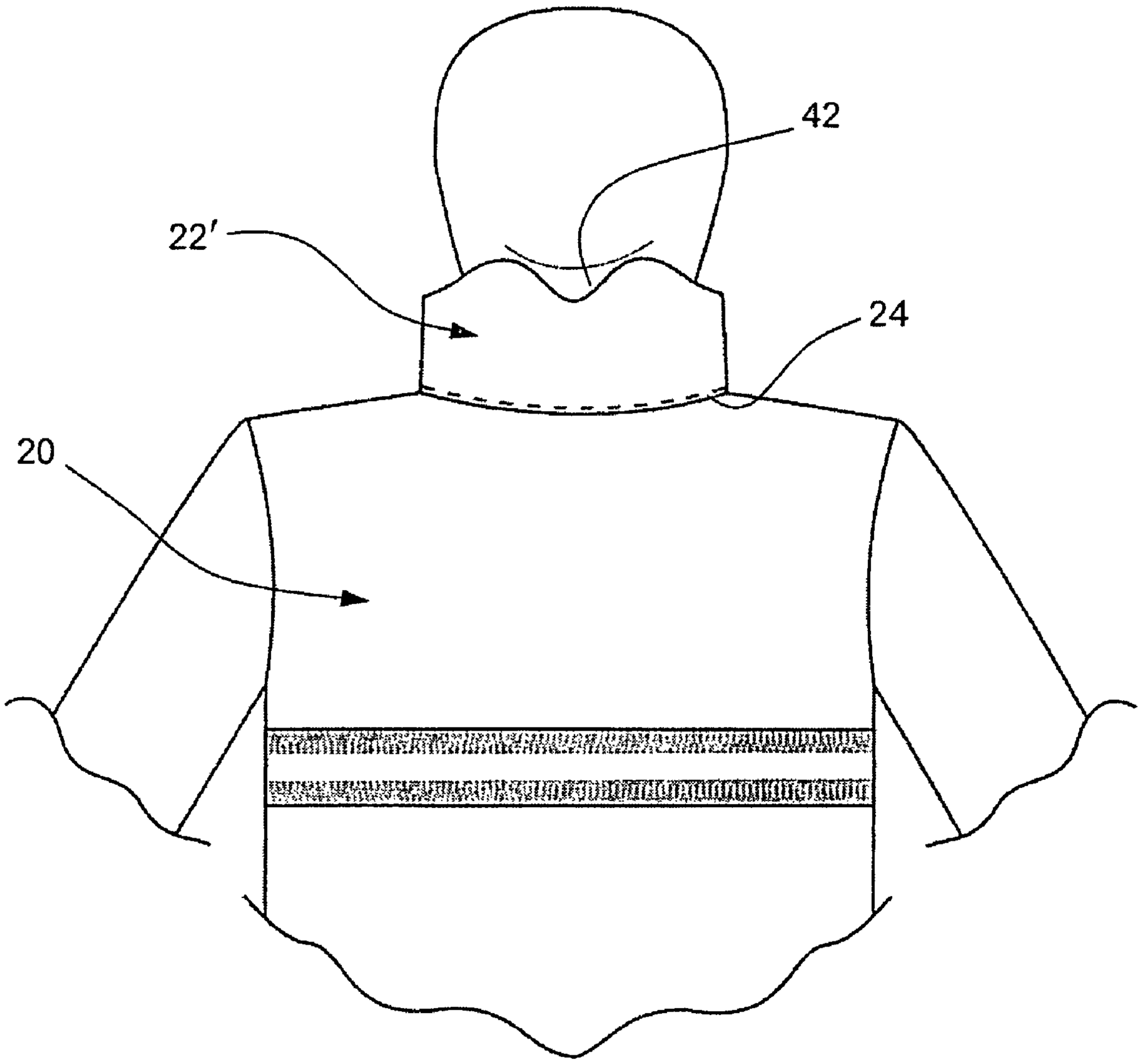

Fig. 8

COLLAR CONFIGURATION FOR FIREFIGHTER GARMENT

CROSS-REFERENCE TO RELATED APPLICATION

This patent application claims priority on U.S. Provisional Patent Application No. 60/883,897, filed on Jan. 8, 2007.

BACKGROUND OF THE APPLICATION

1. Field of the Application

The present application relates to firefighter garments and, more particularly, to a collar configuration for a protective firefighter jacket which helps to protect from fire, oppressive heat, water infiltration and elements while ergonomically adapting to the user's body specifics and protection equipment.

2. Background Art

Few working environments are as hostile as that of firefighters. In addition to the extreme heat from combustion/smoldering, a firefighter may be subjected to a variety of hazards: steam, pressurized water jet, falling debris—often burning, etc.

Therefore, protective garments used in firefighting must protect the firefighter from such extreme conditions. On the other hand, due to the nature of their job, firefighters must be capable of moving relatively freely to perform physically intensive actions. A firefighter may be required to break through some doors or walls, lift or displace objects, carry people in rescue situations, use an axe, hook or like tools, as well as maneuver a high-pressure water hose.

In the past, the collar of protective jackets for firefighters was restricted to a uniform height (i.e., fixed height) of 4 inches, as per an interpretation of the NFPA 1971 standards. This is illustrated in FIG. **1** of the prior art, in which a protective jacket **10** is shown having a collar **12** of uniform height, which essentially formed a circular edge of a cylinder with a storm flap **14**. As such, the collar of protective jackets was not perfectly suited to the body shape/morphology of the users of these jackets. Moreover, as the protective jackets are worn in combination with other bulky equipment such as firefighter helmets, the uniform-height collars have been known to impede the movements of the firefighters.

SUMMARY OF THE APPLICATION

It is therefore an aim of the present application to provide a novel firefighter protective jacket.

Therefore, in accordance with the present invention, there is provided a jacket of the type used by firefighters as protective garment, wherein a collar of the jacket comprises a lower edge connected to a shoulder/torso portion of the jacket in a straight seam, an upper exposed edge spaced apart from the lower edge, and a given shape to the upper exposed edge such that a variable height is defined between the lower edge and the upper exposed edge along the upper exposed edge.

Further in accordance with the present invention, there is provided the clothing of firefighter composed of an outer shell retardant to the flames, a thermal liner to reduce heat and of a moisture barrier to avoid water infiltration.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front schematic view of a firefighter protective jacket in accordance with the prior art;

FIG. **2** is a side schematic view of a firefighter protective jacket with a variable-height collar in accordance with a first preferred embodiment of the present application;

FIG. **3** is an enlarged side schematic view of the firefighter protective jacket with the variable-height collar of FIG. **2**, with respect to a firefighter hood;

FIG. **4** is a side schematic view of a firefighter protective jacket with a variable-height collar in accordance with a second preferred embodiment of the present application, shaped to match a body shape/morphology of a firefighter;

FIG. **5** is a schematic sectional view illustrating a construction of the variable-height collar of the firefighter protective jacket of the present application;

FIG. **6** is an enlarged side schematic view of the firefighter protective jacket with the variable-height collar of FIG. **2**, as worn with a firefighter helmet and a breathing mask;

FIG. **7** is a front schematic view of the firefighter protective jacket with the variable-height collar of FIG. **2**; and

FIG. **8** is a rear schematic view of the firefighter protective jacket with the variable-height collar of FIG. **4**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and more particularly to FIG. **2**, a firefighter protective jacket with a variable-height collar in accordance with a first preferred embodiment is generally shown at **20**. The jacket **20** has a variable-height collar **22** having a lower edge **24** by which the collar **22** is connected to the shoulder/torso portion **26** of the jacket **20**. A storm flap **25** is provided to cover the front zipped opening of the jacket **20**. The upper exposed edge **28** of the collar **22** is shown having an arcuate shape, such that the height between the lower edge **24** and the upper exposed edge **28** varies along the collar **22**.

The jacket **20** is provided with a collar of variable height so as to provide a better fit with adjacent equipment and/or the body shape of the firefighter.

Referring to FIG. **3**, the variable-height collar **22** is shaped as a function of a firefighter hood **30** (i.e., head gear). It is pointed out that like elements will bear like reference numerals in FIGS. **2** to **8**.

The hood **30** has a lower periphery **32** having a given shape. The variable-height collar **22** is concave so as to be complementary in shape to that of the lower periphery **32** of the hood **30**. More specifically, a concave edge portion **34** is defined in the upper exposed edge **28** of the collar **22**.

Referring to FIG. **6**, the variable-height collar **22** is shown as worn with a firefighter helmet **35** incorporating a neck flap **36** overlying the collar **22**. The wearer also ports a breathing mask **37** connected to a self-contained breathing apparatus (SCBA). The concave edge portion **34** of the collar **22** follows the shape of the jaw and chin of the wearer. The lesser height at the front of the collar **22** allows the breathing mask **37** to be used freely. The variable-height collar **22** can also be configured for use with a face mask, a helmet chin strap, earflaps, goggles, and a face shield.

This configuration of the variable-height collar **22** is such that the firefighter can freely execute movements while being suitably protected by the collar **22**. The human anatomy allows multiple degrees of freedom of movement of the head with respect to the torso, and the variable-height collar **22** facilitates the movement of the wearer's head when compared to prior-art collars. Accordingly, the collar **22** does not impede the free movement of the firefighter wearing the jacket **20** and the helmet **30**. Although only one side of the

collar **22** is visible in FIG. **3**, it is considered to provide concave edge portions **34** on both the left and right sides of the collar **22**.

Referring to FIG. **4**, the jacket **20** is shown having a variable-height collar **22'** shaped as a function of the body shape/morphology of the firefighter. More specifically, a concave edge portion **40** is defined in the upper exposed edge **28** of the collar **22'**. The concave edge portion **40** is aligned with the ear of the firefighter. Accordingly, more play is provided for tilting motion of the firefighter's head without interference of the upper exposed edge **28** with the ears of the firefighter.

The variable-height collar **22'** also features the concave edge portion **34** to follow the jaw and chin of the wearer. Moreover, as shown in FIG. **6**, a concavity **42** is provided in the upper exposed edge **28** of the collar **22'**, so as to conform to the occipital region of the skull. Therefore, more play is provided for a rearward tilting motion of the firefighter's head. As the variable-height collar **22'** features less material in areas opposite protruding portions of the head (e.g., ears, occiput, jaw, chin), the collar **22'** will not have a tendency to bunch up when the head is tilted. The bunching up in the prior-art collars can potentially displace the protective flaps (e.g., neck flap, earflap), resulting in reduced protection of the wearer.

Although only one side of the collar **22'** is visible in FIG. **4**, it is considered to provide concave edge portions **34** and **40** on both the left and right sides of the collar **22'**.

Referring to FIG. **7**, the protective jacket **20** having the variable-height collar **22** is shown with the storm flap **25**. The storm flap **25** is a one-piece flap in an inverted-L, shape. The storm flap **25** covers the front zipped opening of the jacket **20**. The flap **25** is sized so as to be below the upper exposed edge **28** of the variable-height collar **22**, thereby not interfering with the chin of the wearer. Accordingly, the combination of the collar **22** and storm flap **25** is well suited to match the wearer's facial shape.

The variable-height collars **22** and **22'** (FIGS. **2**, **3**, **4**, and **8**) mould the shape of the lower section of the face and/or the shape of the equipment. This will enhance the protection against water infiltration, spark exposure, and/or oppressive heat, while not impeding the movements and comfort of the firefighter.

The variable-height collars will improve comfort of the firefighter, and can also be configured to improve the visibility of the firefighter in given orientations (e.g., when the firefighter looks down). Moreover, as less fabric is used when compared to prior-art firefighter jackets with uniform-height collars, the variable-height collars are lighter.

Referring to FIG. **5**, a typical construction of the protective jacket **20** is illustrated. More specifically, an outer shell **50** encapsulates a thermal liner **51** and a moisture barrier **52**. In order to vary the height of the collar **22**, a free end **53** of the collar **22** is flipped inside the gap between the thermal liner **51** and the moisture barrier **52**. The depth of insertion of the free end **53** is varied so as to create the desired variable height H of the collar **22**. A thread seam **54** is made to set the height of the collar **22**. The construction illustrated in FIG. **5** is one of numerous other considered constructions for the protective jacket **20**.

According to the NFPA 1971-2007 standards, the height H is at least 3 inches. It is considered to vary the height H from 3 to 4 inches for the variable-height collar. Although two different embodiments have been provided for the variable-height collar, numerous other embodiments are considered, featuring curved and/or straight variable-height collars.

The protective jacket with the variable-height collar as described previously can be used as firefighter protective gear, and also as gear for structural firefighting, wildland firefighting, and as emergency medical service garment, urban search and rescue garment, and extrication garment.

The invention claimed is:

1. A jacket of the type used by firefighters as protective garment, wherein a collar of the jacket projects upwardly from a shoulder/torso portion in a protective configuration, the collar comprising a lower edge connected to the shoulder/torso portion of the jacket in a straight seam, an upper exposed edge spaced apart from the lower edge, and a given shape to the upper exposed edge such that a variable height is defined between the lower edge and the upper exposed edge along the upper exposed edge, and wherein in the protective configuration with the collar projecting upwardly the given shape is as a function of anatomical features of a wearer of the jacket and defines two opposed concave edge portions in the upper exposed edge with the concave edge portions being located on opposite sides of the collar and each extending frontwardly from an adjacent convex edge portion, the concave edge portions being in alignment with the respective jaw sides of the wearer, the given shape defining two opposed other concave edge portions in the upper exposed edge with each other concave edge portion being located in alignment with a respective ear of the wearer, each concave edge portion being connected to a respective one of the other concave edge portions through the adjacent convex edge portion.

2. The jacket according to claim **1**, wherein the given shape defines a concave portion in alignment with the occiput of the wearer.

3. The jacket according to claim **1**, further comprising a storm flap, with a top edge of the storm flap being positioned below the upper exposed edge of the collar when closed.

4. The jacket according to claim **3**, wherein the storm flap is a one-piece flap having an inverted-L shape.

5. The jacket according to claim **1**, wherein the jacket comprises an outer shell retardant to the flames, a thermal liner to provide heat insulation, and a moisture barrier to generally prevent water infiltration.

6. The jacket according to claim **1**, wherein the concave edge portions are below the jaw when the jacket is worn in the protective configuration with the collar projecting upwardly.

7. The jacket according to claim **1**, wherein the other concave edge portions are below the ears when the jacket is worn in the protective configuration with the collar projecting upwardly.

* * * * *